2020-04-05

Human Empathy as a Basis for Cross-Cultural Healthcare Design

Alejandro M. Marzoratti
Worcester Polytechnic Institute

Emily Alyssa Gordon
Worcester Polytechnic Institute

Fay X. Whittall
Worcester Polytechnic Institute

Nathan J. Gere
Worcester Polytechnic Institute

Human Empathy as a Basis for Cross-Cultural Healthcare Design

By: Nathan Gere, Emily Gordon, Alejandro Marzoratti, Fay Whittall

Improving Health Care Services in Dwenase, Ghana Utilizing Co-Design Methods

Image 1

The goal of our project was to work in collaboration with the people of Dwenase, Ghana to improve their health center using a human-centered co-design process. Human-centered means empathizing with the local people, allowing designers to visualize and understand the effects that potential solutions could have on the community. This essentially means that by having empathy, designers would be able to foresee adverse effects that could arise and could opt for solutions with less - or no - negative effects on the community. Additionally, co-design is working with the community to develop solutions together, since they know best what they need and what will work. This differs from human-centered design because it does not require putting oneself in the shoes of the local people. Instead, it aims to blend together contributions from the community - the "local experts" - with that of the "academic experts" to create the best possible solution. In order to develop an effective, long-term solution that all stakeholders can take pride in, designers must approach the design process with both human-centered design and co-design in mind.

As anthropologist Arturo Escobar wrote: "effective, meaningful design is a social activity, in which the designer is one actor among many [...] The materials of design also include communities, processes, practices and culture, and designers need to be equipped with the right skill to deal with these elements."[1] For this project in particular, it was important to bear in mind that the people of Dwenase have the most insight into the issues that we are collectively trying to solve and were considered our partners in developing solutions.

Another potential longer-term partner in our project would be the Ghanaian government, which has recently been dedicating significant funding to improving health services around the country. Funds have been appropriated for improving "prehospital care, personnel training, health care resource provision, communication improvements, transportation services, and new health facilities."[2] The government has also been putting money towards continuing education for health care staff and improving clinic

infrastructure. It is possible that this would allow for the allocation of funds for the Dwenase Health Center to be improved as per the recommendations set forth in this paper.

Overall, we are hopeful that this project will help establish a basis for improving the community's usage and quality of care that the Dwenase Health Center can provide to those that seek their services, ultimately leading to a happier and healthier community.

"'World development means nothing less than the illumination of the central idea of freedom' - Eugene Black, President of the World Bank."[3]

*Image 2

An Ethnographic Approach

To understand the place of ethnography in design, it is key to first understand research design itself as "the process of seeing and formulating a sociological problem."[4] Essentially, any problem that may look technical could very well have sociological issues that could be discovered by interacting with the affected community. Key here is the revelation that design is a process, and more precisely, one that continues well into the field. It is essential to bear witness to the social context where the problem exists, and by doing so, affirm that solutions solve the problem or if one problem is actually a symptom of deeper concerns.

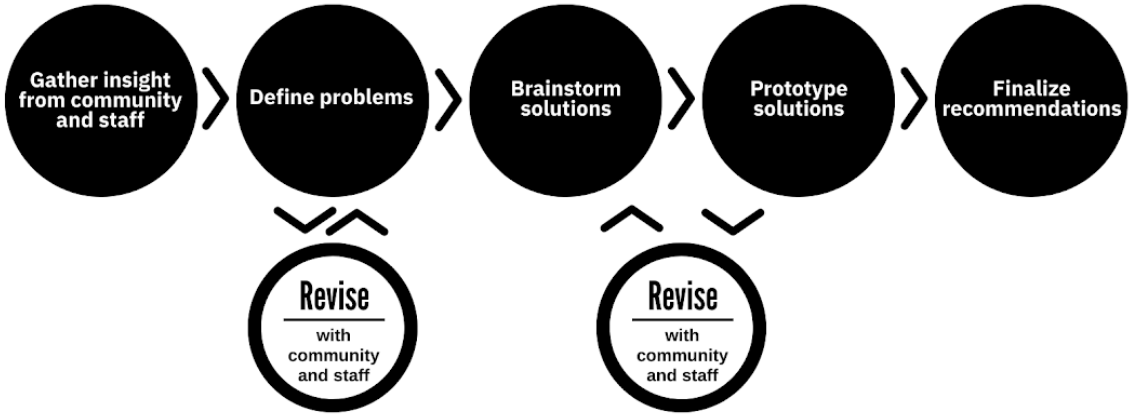
The principles of ethnography align precisely with those outlined in the definition of design, in that

> "[...] ethnographic research design is flexible, open-ended; it overspills onto the data-collection as well as data-analysis phases. It is to a large extent exploratory; in fact, a research design that does not evolve during fieldwork can be considered suspicious, for it is more common for the ethnographer's expectations to be partly or sometimes radically altered than for everything to go as expected."[4]

Essentially, we let go of our preconceived notions on exactly how our design will be carried out in favor of a measure of flexibility dependent on the situation and people as we find them.

An example of ethnography's importance can be taken from Mitchell's *Rule of Experts*. With the Allied occupation of Egypt in World War II came an infestation of *anopheles gambiae*, an invasive species of mosquito from sub-Saharan Africa carrying a malignant form of malaria, killing between one and two hundred thousand Egyptians.[5] At the same time, a recently built dam blocked off water flow to many crops in the surrounding area, leaving farmers dependent on chemical fertilizers and, with access to these fertilizers cut off with by the war, ultimately causing famine.[5] When faced with these problems, Ahmad 'Abbud, a plantation owner turned political powerhouse, he heeded to the cries of the people suffering from the famine and equipped the dams with hydroelectric turbines to fuel the creation of artificial fertilizers.[5] While this solution contributed to the end of the famine, it failed to consider the spread of the mosquito, with the epidemic ending more lives than the war.[5] Had 'Abbud recognized that the war efforts, the famine, and the malaria epidemic all helped fueled the other issues, a more comprehensive solution could have been created. However, since he saw this as a technical problem and the Egyptian people as his customers, he unintentionally hurt more than he helped them. This ultimately led to his political downfall.[5]

When given our design problem, we were not only tasked with redesigning a health center, we were tasked with working with a community very different from us. To create a more culturally relevant and effective design, we took an ethnographic approach to developing solutions. With this process, we heard the voices of the community as our collaborators, not our customers. This way, we all worked together as a team to create effective solutions, using the human-centered design process, as shown below.



An important aspect of co-design is gaining the trust and cooperation of community members. To do this, we integrated ourselves into their lives by participating in community-wide events and getting to know individuals through day-to-day interactions, such as attending the children's football games and shopping at local stores. Through this, we were able to better understand the wants and the needs of the community. On the flip side, this helped to gain the trust and cooperation of community members because they were able to know that their voices were being heard, and understand how they will help make their own health center a better place for the entire community.

The first step in the design process was to define the problems. To do this, we held a series of informal discussions with the health center staff and the community. We incorporated local ideas and culture into our planning, allowing the ideas of all stakeholders to be taken into account, and discussed our ideas with community members before developing draft plans.

We also looked beyond the community. We visited St. Dominic's Hospital in Akwatia, as well as health clinics in Abompe, Batebi, and Tumfa to gain further insight into potential solutions. Visiting other health centers allowed us to discover practices that work well at other similar health centers that could potentially be brought back to the Dwenase Health Center.

"No one writing about Egypt in this period describes this interaction. There are studies of military tactics, irrigation methods, Anglo-Egyptian relations, hydraulic engineering, parasites, the sugar industry, and peasants. But there are no accounts that take seriously how these elements interact."[5]

*Image 3

Design Evolution

Since co-design is dynamic in nature, our design has gone through a number of changes since the beginning of our project. The initial goal of our project was to engage the community to develop and propose solutions to the primary issues identified at the health center. As we worked more with the community, we narrowed our focus. First, we aimed to develop an improved floor plan for the health center based on input from the community and staff. In the context of our project, a feasible floor plan is one that clearly exhibits a number of precise changes that will increase the overall efficiency and comfort of the health center. In addition, the aforementioned changes needed to be physically possible given the skills and tools available in the area. Our team also strove to identify and recommend changes that would encourage the community to use the health center. Most importantly, becoming integrated within the Dwenase community and creating a foundation of trust were our chief aspirations. We championed this initiative because "the greatness of a community is most accurately measured by compassionate actions of its members" [6], and we aspired to apply the same sense of compassion to our human-centered design process.

Our co-design process was unique in the sense that our final product is intangible. Initially, in the early part of the gathering insight step, our designs were potential solutions that were drafted solely based on background research conducted on the history of healthcare in the area. For example, our team learned that healthcare delivery in Ghana focuses on affordable community-based care, particularly in areas that are underserved by hospitals and clinics. In 1999, a community-based project originated in Navrongo aiming to establish the feasibility of using trained community health workers to provide basic health services. This project was successful and adopted by the Ghana Health Service to be later

rebranded as the Community-based Health Planning and Services (CHPS) programme.[7] So, our team was aware of the merits of community involvement in healthcare development. In addition, information drawn from literature based on previous Western involvement in the Dwenase Health Center granted us prior suggestions on which we could build. Specifically, the issues of insufficient beds, antibiotics, and antimalarials were realized by analyzing a survey given to the health center staff in 2019.[8] That being said, our team realized that the suggestions formulated before traveling were not based upon knowledge taken directly from the people who face the problems. So, these suggestions could be characterized as surface level due to a lack of the local perspective that would aid in defining problems.

The next steps in the evolution of our design were sparked by new insight provided by community members. More specifically, our suggestions became more complex during the defining problems stage because engagement with the people of Dwenase broadened our understanding of the problems that exist. After only a few visits to the health center, we became enlightened to the fact that the objective lack of space made it difficult for the health center to provide the comfort and ease that the community desired. Thus, our suggestions were shifted toward more efficient uses of space that could potentially make room for more beds and privacy, which is very important for community members. On that note, one of our most perceptive methods of community engagement was simply walking around town asking people about their experiences with the health center in the comfort of their own homes. For example, the community member we talked with in our second interview mentioned that "the [detaining] room there can accommodate only three patients. So you get patients that are more than four, and you need to admit all of them for caring. There is a challenge in admitting the four because of the space. He wishes if they can extend the buildings and fit more beds." Even with the help of a translator, the language barrier made it difficult to get detailed information from our conversations. In lieu of this adversity, valuable sentiments around healthcare in Dweanse were taken from casually talking with those who do or do not use the health center. The majority of community members that we conversed with had similar ideas about the health center as our second interviewee. Although we hoped to get more specific information, our community engagement strengthened another very important aspect of co-design. By getting more people involved in

the brainstorming and prototyping steps of our process, we in turn created more stakeholders for the final design and made great strides towards encouraging people to use the health center. In other words, inviting community members to play a major role in formulating our suggestions gave them a sense of ownership over the design and in turn made them more invested in the outcome.

Finally, our design had evolved into simple, yet effective changes rooted in the determination to address not our concerns but the concerns of the community. Our finalized suggestions, the last step in the process, had taken the form of a floorplan that emphasized minor and major structural changes that, together with the community, we determined would have a positive impact on the day to day operation of the health center. Our feedback finally fostered a sense of creativity in our co-design, and our desire to create comprehensive recommendations began to come into fruition. In conclusion, our design's journey through the cross-cultural co-design process was complete, and we were able to provide holistic suggestions for the people of Dwenase.

"Co-design is the idea that it is the people that experience the problems every day that hold the key to their solutions."[9]

Image 4

Lessons from the Community

As we were beginning to define our design problem, we had a conversation with two community members. There, it was brought to our attention that the cost of receiving care at the Dwenase Health Center is higher than receiving similar treatment at the regional hospital in Akwatia – and it does not matter if the patient has insurance or not. The Dwenase Health Center was also reported to not give out receipts to show where the money is allocated. Our team immediately took this as a concern and stated that it would be one of the chief problems to solve in our design.

However, with more research on Ghanaian Health Insurance and discussion with a human resources representative at St. Dominic's Hospital in Akwatia, we learned about how the NHIS (National Health Insurance Scheme) was put into practice. Enrollment in the

NHIS was much lower than anticipated due to people believing that they will not need the insurance or simply mistrust in the government. While the representative did note that the prices at the Dwenase Health Center were too high, and the distribution of receipts is an encouraged practice, our discussion helped us learn that these are issues on a national scale, not that of Dwenase alone.

We learned another lesson when we visited Abompe to assess their community-based health planning and services (CHPS) compound. Their clinic was located temporarily in someone's home very close to a main road. Dust flies into the window every time a car goes by, giving infections to wounded patients. Plus, when the director of Ghana Health Services visited this CHPS compound, he contracted a respiratory infection. Because of this, the clinic was in danger of being shut down. The community pleaded, asking us for advice and monetary support before we properly toured the health center. This left us in an uncomfortable position, as we did not have the knowledge, expertise, or time to help these communities. From this, we quickly learned that even if we are present in their community to learn, we will be seen as if we are there to help them.

This experience set up our expectations for our visits to Tumfa and Batebi. While their communities did not have as dire of a situation as Abompe, we were better prepared to explain our intentions to learn from their communities rather than to provide aid. These visits further showed us how the Ghanaian health system is as a whole. While our project is focusing on one health center, we recognize that there are larger issues at hand with Ghanaian health care on a national level that we do not have the power or knowledge to solve.

Because of this, we aimed to help out the Dwenase health center and their community as much as we could, keeping in mind the larger issues at hand. This led us to recommend the implementation of the electronic health record system (EHR). The primary purpose of this system is to document the records of patients in the present and the future[10]. It would also benefit more poor, rural communities since a national database of health

records could help determine which communities are more in need of better health care[10]. However, this would be difficult to implement. As said by Achampong,

> "The most immediate benefits of EHR system include accurate medication lists, legible notes and prescriptions, immediately available charts, decreased chart pulls, lower transcription costs, medical errors reduction and improve quality care and standard in patient safety. Unfortunately most countries in sub Saharan Africa and other poor nations lack the experts, fund and ICT infrastructure necessary for the implementation of such modern health care technology to ensure continuity of care."[10]

Essentially, while the EHR promises to be helpful in the long run, it is difficult to get it started up in a community like Ghana[10]. We hope that by contacting the district manager and discussing the EHR system with the head of the Dwenase Health Center, the process of implementing the EHR will be smoother and faster.

"When he goes to the hospital they charged him 10 cedis, but did not give him a receipt. So, he did not know what the charge was for or where the money went." - Dwenase Community Member

*Image 5

Adapting Co-Design for Rural Ghana

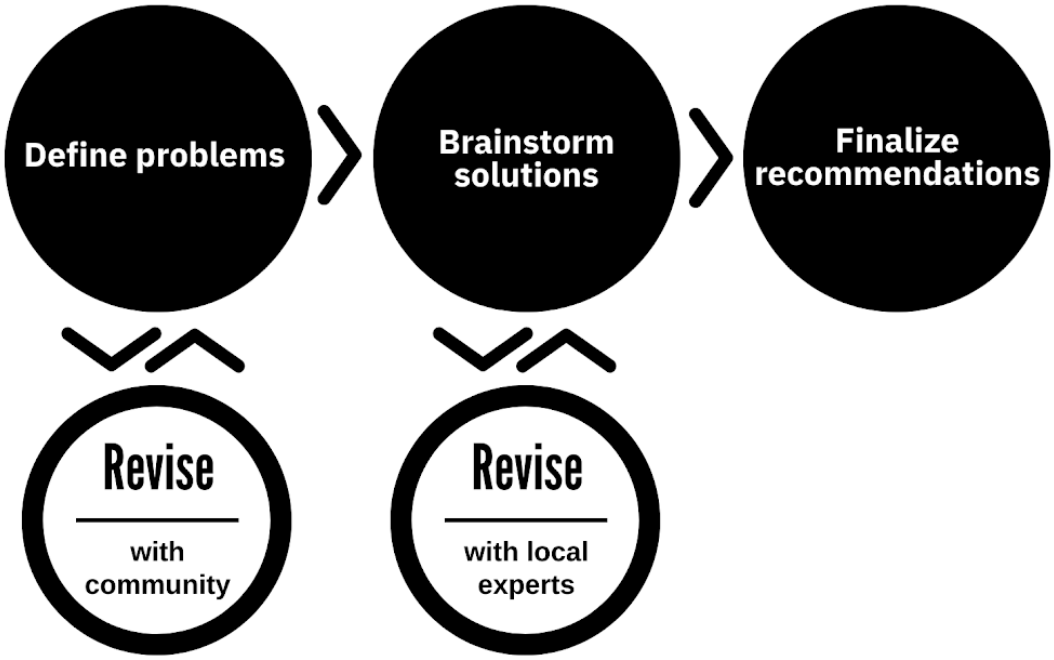
Because we used a cross-cultural design process, our plans underwent significant change as we adapted them to better suit the realities of rural Ghana. Before arriving in Dwenase, our intentions were to carry out a co-design process focused around significant community engagement at numerous stages of the project. First, we intended to work closely with the community to more precisely define the areas for improvement of the health center. Next, we would visit other local health clinics to obtain a local perspective that would jump-start and inspire our ideation of solutions for Dwenase. Later in the process, we would again commune with the people of Dwenase to iteratively critique and revise the proposed solutions to best address the identified issues. Local input at these

stages would be critical for ensuring that the solutions we design with them are both relevant to the issues they face and address those issues satisfactorily. To ensure that a large and diverse portion of the community could contribute their ideas, we planned to hold community forums, form focus groups, and conduct one-on-one discussions.

Upon our arrival in Dwenase, it soon became clear that a number of factors would affect our ability to adhere to the plan we had laid out. Chief among these was the realization that the terms “punctuality” and “scheduling” tend to have more flexible definitions in Ghana. We were first introduced to this while trying to organize a community forum to discuss the areas in which the health center might be improved. The forum was rescheduled twice due to miscommunication, and once more because of a power outage that disabled the public address system used to announce community functions. We eventually made the decision to forgo the forum in favor of a series of one-on-one discussions conducted at homes and businesses throughout Dwenase. This strategy proved quite effective; the people we talked with seemed comfortable communicating with us in a familiar setting. This casual format also served to dissolve the language barrier, as time could be taken for translations. Later, during the solution revision phase of our project, we were met with delays while attempting to set up meetings with the health center staff and local engineers to critique our designs. This limited our ability to perform additional iterations of design refinement, given our brief time frame of seven weeks to complete the project.

Other obstacles further tempered our approach to cultural co-design in Dwenase. It was necessary for us to develop an appreciation of the hidden nuance of issues over which community stakeholders sometimes disagreed. In our communications with both the people of Dwenase and the health center staff, we discovered several topics on which the two groups gave conflicting accounts. One of these was the issuing of written receipts by the health center staff. Several community members remarked that they had not been given receipts after their visits to the health center, while the health center staff claimed that receipts were being issued. Our initial reaction to this discrepancy was to assume that only one group could be telling the truth, thus discrediting the other. However, realizing the ethnographic importance of valuing the input of all local stakeholders, we instead looked

deeper at the issue and realized that this conflict could be explained without invalidating the input of either group. While issuing receipts could be the official policy of the health center, perhaps the practice was not being implemented consistently by all center staff. Alternatively, the desire of the community for written receipts could be interpreted as a broader call for more clarity in the payment process. As a result, we spoke to the center staff about their consistency in writing receipts. We also initiated the process to bring the Electronic Health Records (EHR) system to the Dwenase health center, which would streamline the receipt process, among providing other benefits such as more efficient interactions with the NHIS.



"Human-centered designers are persistently focused on what could be, not the countless obstacles that may get in the way. Constraints are inevitable, and often they push designers toward unexpected solutions."[9]

*Image 6

Looking Forward

After we returned to the United States, there was still much more work to be done at the Dwenase Health Center. The most immediate changes that we recommended were to install partitions in the detaining room for privacy and to implement the Electronic Health Record System (EHR) at the health center. The addition of the EHR would have the effect of increasing community trust in the health center because they will know what they are paying for and that they are being charged the correct amount. Our next recommendation was looking into potential avenues for funding the physical redesign of the layout. The Ghanaian government has been allocating more of their funds for health center improvements in recent years, but it is possible that they will need additional funding to complete the full extent of their work. For this reason, we recommended that they look into private funding or grants. We mentioned that we would be happy to assist them in this endeavour so that we can see the work come into fruition. The final step after funding is secured is to actually complete the recommended changes to the floor plan.

While we believed that this project had a successful outcome, the design process could have developed differently. One issue that we faced throughout our time completing this work were setbacks due to canceled meetings. For example, we had to replace our community forum with one-on-one discussions with community members in their homes and shops. Even though we were not able to reach as many community members as we had hoped, this method allowed us to get more specific, personal information from community members, which was still useful and effective in the long run. Additionally, several meetings with the head of the health center put us behind schedule, and resulted in getting less time to revise and get feedback from the entire health center staff and community. Despite this, we believe that our project produced useful solutions to many of the issues that the health center faces, and we are excited to see them come into fruition in the coming years.

*Image 7

Bibliography

1. Escobar, A. (2017). *Designs for the Pluriverse.* Durham, NC: Duke University Press.

2. Yiadom, M. Y. A. B., McWade, C. M., Awoonor-Williams, K., Appiah-Denkyira, E., & Moresky, R. T. (2018, September 1). Public Health Rationale for Investments in Emergency Medicine in Developing Countries – Ghana as a Case Study. Retrieved from https://www.sciencedirect.com/science/article/pii/S073646791830739X.

3. Staples, A. L. S. & Sayward A. L. (2006). *The Birth of Development: How the World Bank, Food and Agriculture organization, and the World Health Organization Changed the World, 1945-1965.* Kent, OH: Kent State University Press.

4. Danes, S., Williams, T. (2018). *On Ethnography.* Medford, MA: Polity Press.

5. Mitchell, T. (2002). *Rule of Experts.* Berkeley and Los Angeles, CA: University of California Press.

6. King, M. L., & King, C. S. (2014). *The words of Martin Luther King, Jr.* New York, NY: William Morrow, an imprint of HarperCollins Publishers.

7. Aryeetey, E. & Kanbur, S. M. R. (2017). *The Economy of Ghana Sixty Years after Independence,* "Health and Healthcare in Ghana.". Oxford University Press.

8. Burgess, M., Burks, D., Lundberg, D., & Spain, M. (2019). Improving access to quality maternal and neonatal health care in Akyem Dwenase, Eastern region, Ghana. *Boston University School of Public Health,* The Arrive & Thrive! Program. Retrieved from https://www.bu.edu/sph/

9. IDEO.org (2015). *The Field Guide to Human-Centered Design.* Retrieved from: designkit.org.

10. Achampong, Emmanuel. (2012). Electronic Health Record System: A Survey in Ghanaian Hospitals. Open Access Scientific Reports. 1. 10.4172/scientificreports.164.

Credits & Acknowledgements

Our group would like to acknowledge and thank all of those that have helped us throughout this endeavor:

First, thank you to our wonderful advisor, Robert Krueger, and our graduate student assistant, Manasse Kabore. Additionally, thank you to Kim Noonan for all of your support and incredible photos throughout the trip.

Thank you to Osabarima, the chief of Dwenase, for welcoming us to your village and supporting us with our projects every step of the way.

Thank you to Nana Kwesi for all of your support on the ground, and for taking us around the Eastern region to tour other facilities.

Thank you to Honorable Seth Ofoso for setting up a visit for us to St. Dominic's Hospital in Akwatia, as well as your support in implementing the solutions we have devised.

Thank you to the staff at St. Dominic's Hospital in Akwatia for meeting with us and explaining how the health care and insurance systems function in Ghana. Additionally, thank you to the chiefs, health center staff, and community members in Abompe, Batebi, and Tumfa for welcoming us and allowing us to learn from your health centers.

Thank you to Erika, Adua, Abena, and Tina for being so kind and welcoming, and feeding us delicious food every day.

Thank you to the health center staff, especially Gloria and Gertrude, for working with us throughout our time in Ghana. This redesign would not have been possible without you or all of your input, and we are very grateful.

Lastly, thank you to the community of Dwenase for welcoming and working with us for the past seven weeks. We have really enjoyed our time here, and none of this would have been possible without all of you.

Our sincerest thanks,

The Health Center Design Team
Nate, Emily, Alex, and Fay

*Image 8

Appendix - Our Suggested Solutions

Through our engagement with the community, discussions with the Dwenase Health Center staff, visits to other health centers in the region, and academic research, we determined these to be the main problems to solve at the Dwenase Health Center:

- Privacy in detaning (especially separation between men, women, and children)
- Inadequate space
- Transparency between patients and clinic staff regarding cost

Privacy in detaining

After discussion with the physician's assistant at the Dwenase Health Center, our team has installed curtains inside the detaining room. This way, patients will have a form of separation that is breathable, easy to clean, and removable.

The curtains we will add will section off one bed, making it the private bed, and add a barrier between the detaining room and the entrance hallway. While we originally planned to add curtains between each bed, we wanted to be sure that the ceiling fan in the detaining room would still move freely. See Figure 1 for details.

To add the curtains, we purchased fabric and placed them on curtain rods similar to ones already in the health center. In the curtain rod, we attached eyelets as shown in Figure 2. Eyelets were screwed into the crossbeams in the ceiling to attach the curtain rods by the bed along the wall. The curtain at the entrance to the detaining room was attached to nails already in the walls. All materials for the curtains were locally sourced.

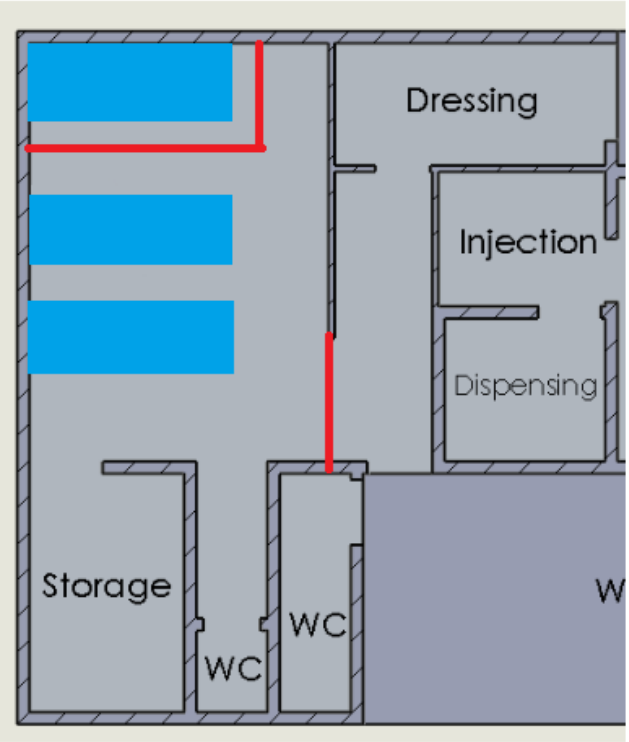


Figure 1: Approximate curtain placement. Red lines represent curtains and blue rectangles represent beds.

Figure 2: Eyelet attached to the inside of a curtain rod.

Inadequate Space

Our methods to increase storage is twofold: adding more shelving in the existing storage room and creating a new storage room off of the detaining room. This way, the existing storage room can become a dispensary, and all other storage can be placed in the new store room. The existing dispensary can then be used as an injection room.

In the main storage room, we recommend adding shelves on the walls that currently do not have shelves, excluding any areas that will affect the use of the door or window. This way, there is more space to place drugs ready to be given to patients. We also recommend extending the storage room window down to a height at which it can be effectively used as a dispensary window and attaching a small, wooden countertop to the window. This way, the room can be made into a dispensary.

The space behind the detaining room can be made into a storage area. We recommend removing one washroom, including the wall and toilet, and installing shelves on the walls, like in the new dispensary. Placing a fan in the room can help increase ventilation. We recommend extending the wall between the inside water closet and the wall against the detaining room and breaking down the portion of the wall leading to the washroom. See Figure 4 for details.

With the increased storage in the dispensary and the larger storage room, the current dispensary can be used as an injection room.

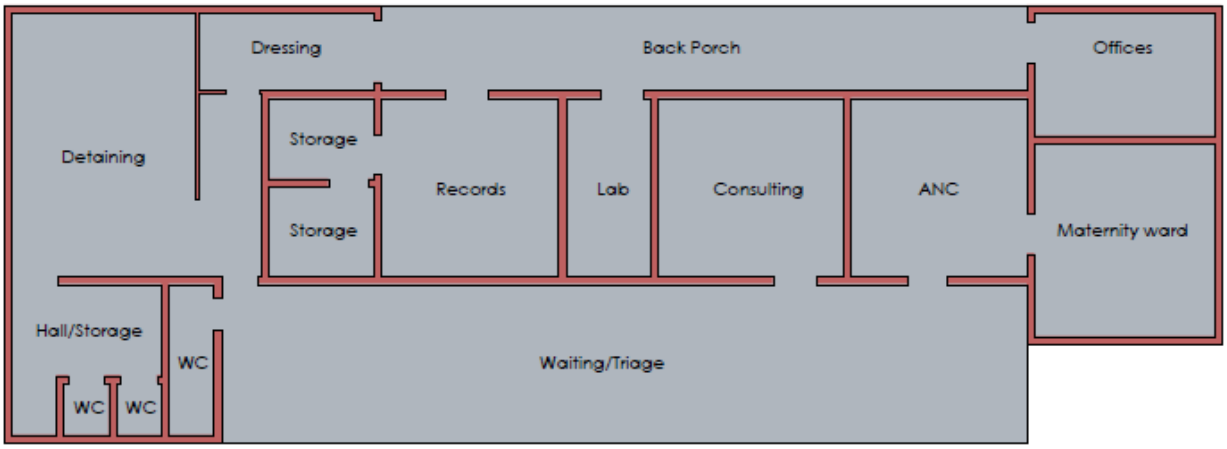


Figure 3: Existing floor plan of the Dwenase Health Center

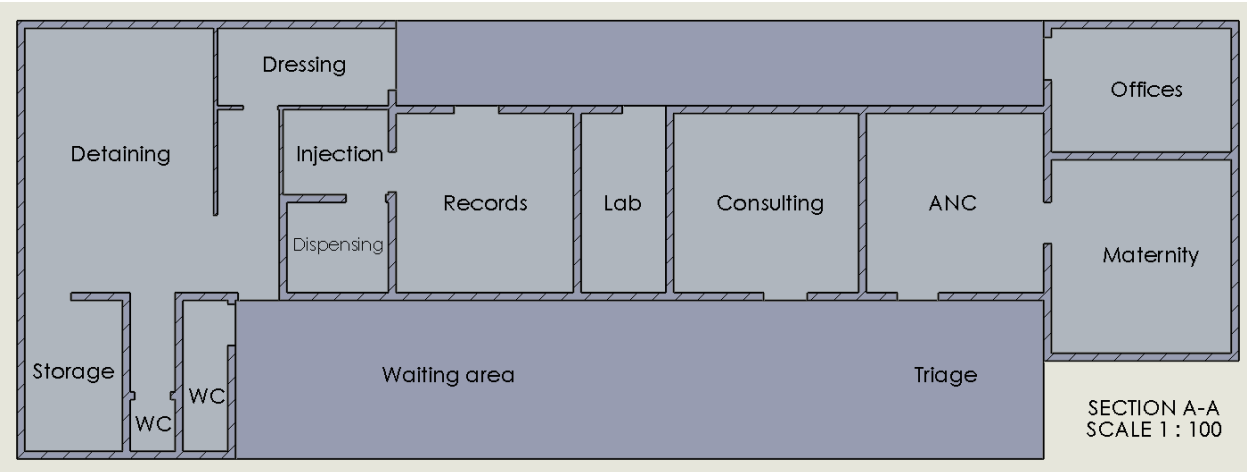


Figure 4: Our recommended floor plan

Cost Transparency

To ensure const transparency, we recommend using the Electronic Health Record System (EHR). We contacted Honorable Seth Ofoso to ask about how this system and he has forwarded another contact who would have more knowledge on how to implement the EHR.

For now, though, we recommend distributing handwritten receipts to patients after they receive care. This will increase trust between the health center and the community before EHR-generated receipts can be used.

Images to add into the paper

Image 1:

Image 2:

Image 3:

Image 4:

Image 5:

Image 6:

Image 7:

Image 8:


WPI